WHAT IS CLAIMED IS:

1. In combination, a heating element, a voltage distribution electrode, and a semiconductor processing chamber, the semiconductor processing chamber comprising:

a wafer support disposed inside the chamber,

a gas delivery channel disposed in the chamber to deliver gas adjacent the wafer support, and

a chamber wall, the chamber wall being in thermal contact with the heating element;

wherein the voltage distribution electrode is disposed adjacent the chamber wall.

2. The combination of claim 1, wherein the heating element is an electrical heating element.

3. The combination of claim 1, wherein the heating element comprises:

a conduit, and

a thermal working fluid flowing through the conduit.

4. The combination of claim 1, wherein the voltage distribution electrode has a circular shape.

5. The combination of claim 4, wherein the voltage distribution electrode comprises:

a circular loop; and

radial segments connected together by the circular loop.

6. A temperature management apparatus for promoting thermal uniformity for a chamber wall, the apparatus comprising:

a substrate having a predetermined shape and having edges;

a resistive heating element disposed on the substrate adjacent to the edges of the substrate;

wherein the substrate is adapted to provide thermal communication with the chamber wall.

7. The temperature management apparatus of claim 6, wherein the predetermined shape promotes even distribution of heat energy over the chamber wall.

8. The temperature management apparatus of claim 6, further comprising:

a source of air flow disposed near the chamber wall so as to remove excess heat energy.

9. The temperature management apparatus of claim 8, where the source of air flow comprises a fan.

10. The temperature management apparatus of claim 6, further comprising:

a temperature sensor adapted to be disposed in intimate contact with the chamber wall so as to generate a temperature signal indicative of the temperature of the chamber wall; and

a power control circuit connected to receive the temperature signal as a feedback signal so as to provide a controlled amount of power dissipated by the resistive heating element.

11. The temperature management apparatus of claim 10, wherein the power dissipated by the resistive heating element is controlled so as to be at a minimum level when plasma is energized near the chamber wall, and to be at a maximum level when no plasma is energized near the chamber wall.

12. The temperature management apparatus of claim 11, wherein the minimum level corresponds to substantially no power dissipation.

13. The temperature management apparatus of claim 6, wherein the predetermined shape is substantially radially symmetric.

14. The temperature management apparatus of claim 13, wherein the predetermined shape comprises plural radial elements and a circular element, disposed at the periphery of the substrate, joining the plural radial elements together.

15. The temperature management apparatus of claim 14, wherein at least one gap is formed in the circular element.

16. The temperature management apparatus of claim 15, wherein at least two gaps are formed in the circular element, the gaps being arranged substantially symmetrically.

17. The temperature management apparatus of claim 13, wherein the predetermined shape comprises plural radial elements and a circular element, disposed near the center of the substrate, joining the plural radial elements together.

18. The temperature management apparatus of claim 17, wherein at least one gap is formed in the circular element.

19. The temperature management apparatus of claim 6, wherein the substrate is electrically conductive and forms a voltage distribution electrode.

20. The temperature management apparatus of claim 6, wherein the resistive heating element comprises: plural resistive segments arranged such that spatially adjacent ones of the plural resistive segments have electrical current flowing in opposite directions.

21. The temperature management apparatus of claim 20, wherein the plural resistive segments are electrically connected in series with one another.

22. A temperature management apparatus for promoting thermal uniformity for a chamber wall, the apparatus comprising:

a fluid conduit having a predetermined shape and having a substantially flattened cross section; and

a thermal working fluid disposed in and flowing through the fluid conduit.

23. The temperature management apparatus of claim 22, wherein the predetermined shape promotes even distribution of heat energy over the chamber wall.

24. The temperature management apparatus of claim 22, wherein the predetermined shape is substantially radially symmetric.

25. The temperature management apparatus of claim 22, further comprising:

a source of air flow disposed near the chamber wall so as to remove excess heat energy.

26. The temperature management apparatus of claim 25, where the source of air flow comprises a fan.

27. The temperature management apparatus of claim 22, where the thermal working fluid is provided via connection to a temperature controlled reservoir.

28. An apparatus for processing a semiconductor wafer comprising:

a vacuum chamber adapted to receive the semiconductor wafer therein, the vacuum chamber having a chamber wall; and

a temperature management apparatus comprising:

a heater disposed outside of the vacuum chamber in thermal contact with the chamber wall, and

a source of air flow disposed near the dielectric wall to remove excess heat energy.

29. The apparatus for processing a semiconductor wafer of claim 28, further comprising:

an RF coil disposed adjacent to the vacuum chamber so as to couple RF energy into the vacuum chamber, the heater being disposed between the RF coil and the chamber wall; and

a voltage distribution electrode disposed between the heater and the chamber wall.

30. The apparatus for processing a semiconductor wafer of claim 29, wherein the heater is substantially electrically transparent to the RF energy coupled into the chamber.

31. The apparatus for processing a semiconductor wafer of claim 29, wherein the heater does not substantially hinder generation of plasma in the chamber by the RF energy coupled into the chamber.

32. The apparatus for processing a semiconductor wafer of claim 28, further comprising:

an RF coil disposed adjacent to the vacuum chamber so as to couple RF energy into the vacuum chamber, the heater being disposed between the RF coil and the chamber wall; and

a Faraday shield having variable shielding efficiency, the shield being disposed between the heater and the chamber wall.

33. The apparatus for processing a semiconductor wafer of claim 32, wherein the heater is substantially electrically transparent to the RF energy coupled into the chamber.

34. The apparatus for processing a semiconductor wafer of claim 28, wherein the chamber wall is a flat lid.

35. The apparatus for processing a semiconductor wafer of claim 28, wherein the chamber wall is a dome-shaped lid.

36. The apparatus for processing a semiconductor wafer of claim 28, wherein the chamber wall is a hemispherical shaped lid.

37. The apparatus for processing a semiconductor wafer of claim 28, wherein source of air flow comprises a fan.

38. The apparatus for processing a semiconductor wafer of claim 28, wherein the heater is in physical contact with the chamber wall.